

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A changeable lock assembly that can be reconfigured to operate with different keys of a set of user keys, without disassembling the lock, comprising:
 - a) a ~~set~~ subset of keys, the ~~set~~ subset of keys comprising ~~including~~ at least a first user key having a first contour edge that operates the lock in a first lock configuration but does not operate the lock in a second lock configuration, and a second user key having a second contour edge that operates the lock in the second lock configuration but does not operate the lock in the first lock configuration, wherein the first contour edge and the second contour edge have at least a first contour position and a second contour position that are differently configured;
 - b) a housing having a generally cylindrical bore with an inner surface and a plurality of generally cylindrical driver chambers intersecting the bore surface;
 - c) a plurality of generally cylindrical drivers, each driver being positioned and movable within one driver chamber and being urged toward the bore surface;
 - d) a plug having a generally cylindrical periphery and rotatably mounted within the bore so as to form a shear line at the interface of the bore surface and the plug periphery, the plug further having:
 - 1) a longitudinal axis;
 - 2) a keyway intersecting the periphery and parallel to the longitudinal axis and configured to receive a key selected from the ~~set~~ subset of keys;
 - 3) a plurality of generally cylindrical tumbler chambers intersecting the periphery and the keyway, and being generally orthogonal to the longitudinal axis, each tumbler chamber being aligned with a driver chamber when the plug is at a first rotated position with respect to the housing so as to form a pin chamber; and
 - 4) a plurality of retainer cavities intersecting the periphery, each retainer cavity being spaced apart from a corresponding tumbler chamber and aligned with a corresponding driver chamber when the plug is at a second rotated position with

respect to the housing; and

5) a change tool slot configured parallel to the longitudinal axis, that extends from the front face of the plug and intersects a portion of each of the retainer cavities;

e) a change tool that can be inserted within the change slot;

f) a plurality of tumblers, each tumbler being positioned and movable within one tumbler chamber; and

g) [[f]] a plurality of lock configuration change balls, each change ball being associated with one pin chamber, having a first position within the pin chamber between the driver and tumbler, and a second position within the retainer cavity, and being movable from the second position within the retainer cavity upon insertion of the [[a]] change tool into the change tool slot.

2. (Original) The changeable lock assembly of Claim 1 wherein the first contour position of the first key is a lower position and the second contour position of the first key is a raised position, and wherein, when the lock is configured to operate with the first key, a first change ball corresponding to the first contour position is disposed in its pin chamber, and a second change ball corresponding to the second contour position is disposed in its retainer cavity.

3. (Original) The changeable lock assembly of Claim 2 wherein the first contour position of the second key is a raised position and the second contour position of the second key is a lower position, wherein the driver that is disposed in the pin chamber corresponding to the second contour position spans across the shear line when the second key is inserted into the keyway, whereby the plug can not rotate within the housing, such that the second key can not operate the lock.

4. (Previously Presented) The changeable lock assembly of Claim 1 wherein, when an operable key is disposed in the keyway and the plug is at the second rotated position, and the change tool is positioned within the change tool slot, any change ball in its second position has been moved into its corresponding driver chamber.

5. (Canceled)

6. (Currently amended) A changeable lock assembly comprising:

- a) a set ~~subset~~ of user keys, ~~said subset of user keys~~ comprising at least a first user key and a second user key, each user key having at least one contour position;
- b) a housing having a bore therein;
- c) a plug rotatably mounted in the bore, the plug having:
 - i) a longitudinal axis;
 - ii) a first passage parallel to the longitudinal axis, and configured to receive a key selected from the set ~~a subset~~ of user keys; [[and]]
 - iii) at least one retainer cavity; and
 - iv) a second passage configured in the plug that intersects a portion of the at least one retainer cavity;
- d) a change tool configured to be received within the second passage; and
- e) at least one change ball member movable within the lock between a first position in the plug and a second position within the at least one retainer cavity in the plug, the change ball member being disposed in the first position and movable from the first position to the second position, to reconfigure the lock for operation with the second user key, solely in response to insertion of the second user key into the first passage of the plug disposed in a first rotated position within the bore, and rotation of the plug by the operation of the second user key to a second rotated position within the bore;

wherein when the change ball member is in the first position, the first user key operates the lock, wherein when the change ball member is in the second position, the first user key does not operate the lock, ~~and wherein the second passage intersects a portion of the second position in the plug.~~

Claim 7-8 (Canceled)

9. (Currently amended) The lock assembly of claim 6 ~~8~~, ~~wherein the second passage intersects the retainer cavity, and~~ wherein the change ball member can be disposed in the retainer cavity when the change tool is not positioned in the second passage.

10. (Currently amended) The lock assembly of claim 9[[8]], wherein the change ball member cannot be disposed in the retainer cavity when the change tool is positioned in the second passage.

11. (Currently amended) The lock assembly of claim 9[[8]], wherein the change ball member is movable from the first position to the second position only when the change tool is not positioned in the second passage.

12. (Currently amended) The lock assembly of claim 10[[8]], wherein the change ball member is movable from the at least one retainer cavity ~~second position~~ to the first position when the change tool is positioned in the second passage.

Claims 13-21 (Canceled)

22. (Currently amended) The lock assembly of claim 11, further comprising a shim disposed in the lock adjacent to the change ball member when the change ball member is in the first position.

23. (Original) The lock assembly of claim 22, wherein the shim has a first diameter and the retainer cavity has a second diameter, the first diameter being greater than the second diameter.

Claims 24-43 (Canceled)

44. (Previously Presented) The changeable lock assembly of Claim 1 wherein each retainer cavity has an opening of a size smaller than the diameter of the driver, wherein the driver can not enter through the opening and into the retainer cavity when the plug is in its second rotated position.

45. (Previously Presented) The changeable lock assembly of Claim 1 wherein the change tool is remote from the lock during operation of the lock.

46. (Previously Presented) The changeable lock assembly of claim 4 wherein the lock has a reset configuration wherein each change ball is disposed in its tumbler chamber when no key is inserted into the keyway.

47. (Previously Presented) The changeable lock assembly of claim 46 wherein the lock can be configured for operation by a user key by insertion of the user key into the keyway of the lock in reset configuration, and rotation of the plug to its second rotated position.

48. (Previously Presented) The changeable lock assembly of claim 1 wherein the change tool has a linear upper edge that can raise each change ball out of its respective retainer cavity.

49. (Currently amended) The changeable lock assembly of claim 1 wherein the same change tool can be used to reset the lock and to reconfigure the lock for any key of the set ~~subset~~ of keys.

50. (Currently amended) The changeable lock assembly of claim 1, wherein the set of keys further comprises ~~comprising~~ a programming key having a contour edge configured to raise any change ball in a tumbler chamber above the shear line upon its insertion into the keyway, and upon its operation of the lock, to move the change ball into its respective retainer cavity upon rotation of the plug to its second rotated position, wherein the lock can be operated with the programming key, but not with the user keys.

51. (Previously presented) The changeable lock assembly of Claim 1 wherein at least one change ball is disposed in the second position to configure the lock for operation with one of the user keys, and wherein the lock can not be configured to operate with a user key when the change tool is disposed within the change tool slot.

52. (Previously Presented) The changeable lock assembly of Claim 1 wherein the lock can be reconfigured only when all of the change balls have been disposed in their respective pin chambers.

53. (Previously presented) The changeable lock assembly of Claim 1 further comprising a plurality of master shims, wherein one of the plurality of master shims is disposed between each tumbler and the change ball when the change ball is in its first position, the master shims having a first diameter and the retainer cavity having a second diameter, the first diameter being greater than the second diameter.

54. (Previously presented) The changeable lock assembly of Claim 53 further comprising a master key having a contour edge configured to raise the plurality of master shims above the shear line, wherein any change ball positioned above the master shims can not be deposited into the retainer cavity in the second rotated position.

55. (Currently amended) The changeable lock assembly of Claim 6, comprising a plurality of between 2 and 10 change balls ~~members~~ and corresponding retainer cavities.

56. (Canceled)

57. (Currently amended) The changeable lock assembly of Claim 6 [[56]], wherein the retainer cavity has an opening in the periphery of the plug, wherein the housing has a plurality of cylindrical driver chambers intersecting the surface of the bore, and further comprising a plurality of cylindrical drivers, each positioned and moveable within one driver chamber and being urged toward the bore surface, wherein the diameter of the driver is larger than the opening of the retainer cavity to prevent the driver from entering into the retainer cavity.

58. (Currently amended) The changeable lock assembly of Claim 6 wherein when the change tool is disposed in the second passage, the change ball ~~member~~ is displaced from its second position.

59. (Currently amended) The changeable lock assembly of Claim 58 wherein after the plug, with the change tool inserted in the second passage, is rotated to the first rotated position, and the change tool is removed from the second passage, the at least one change ball is returned to its first position and the lock is placed in a reset configuration, from where the lock can be reconfigured to operate with the first user key, solely in response to insertion of the first user key inserted into the first passage and rotation of the plug to the second rotated position.

60. (Currently amended) A changeable lock assembly that can be reconfigured to operate with different keys of a set of user keys, without disassembling the lock, comprising:

a) a set subset of keys, the set subset of keys comprising including at least a first key having a first contour edge that operates the lock in a first lock configuration but does not operate the lock in a second lock configuration, and a second key having a second contour edge that operates the lock in the second lock configuration but does not operate the lock in the first lock configuration, wherein the first contour edge has at least a first contour position and a second contour position that are differently configured than the first contour position and second contour position of the second contour edge;

b) a housing having a cylindrical bore with an inner surface and a plurality of generally cylindrical driver chambers intersecting the inner surface;

c) a plurality of cylindrical drivers, each driver being positioned and movable within one driver chamber and being urged toward the bore surface;

d) a plug having a cylindrical periphery and rotatably mounted within the bore so as to form a shear line at the interface of the bore surface and the plug periphery, the plug further having:

1) a keyway configured to receive a key selected from the subset of keys;

2) a plurality of cylindrical tumbler chambers intersecting the periphery and the keyway, each tumbler chamber being aligned with a driver chamber when the plug is at a first rotated position with respect to the housing so as to form a pin chamber; and

3) a plurality of retainer cavities intersecting the periphery, each retainer cavity being spaced apart from a corresponding tumbler chamber and aligned with a corresponding driver chamber when the plug is at a second rotated position with respect to the housing; and

4) a change tool slot that intersects a portion of each of the retainer cavities; and

5) a change tool;

e) a plurality of tumblers, each tumbler being positioned and movable within one tumbler chamber; and

f) a plurality of lock configuration change balls, each change ball being associated with one pin chamber, having a first position within the pin chamber between the driver and tumbler, and a second position within the retainer cavity, and being displaced out of the retainer cavities by the [[a]] change tool in the change tool slot.

61. (Previously Presented) The changeable lock assembly of Claim 60 wherein each retainer cavity has an opening of a size smaller than the diameter of the driver, wherein the driver can not enter through the opening and into the retainer cavity when the plug is in its second rotated position.

62. (Previously Presented) The changeable lock assembly of Claim 61 wherein the change tool is remote from the lock during operation of the lock.

63. (Previously Presented) The changeable lock assembly of claim 60 wherein the same change tool can be used to reset the lock and to reconfigure the lock for any key of the subset of keys.

64. (Previously presented) The changeable lock assembly of Claim 60 wherein at least one change ball is disposed in the second position to configure the lock for operation with one of the user keys, and wherein the lock can not be configured to operate with a user key when the change tool is disposed within the change tool slot.

65. (Previously Presented) The changeable lock assembly of Claim 60 wherein the lock can be reconfigured only when all of the change balls have been disposed in their respective pin chambers.

66. (Previously presented) The changeable lock assembly of Claim 60 further comprising a plurality of master shims, wherein one of the plurality of master shims is disposed between each tumbler and the change ball when the change ball is in its first position, the master shims having a first diameter and the retainer cavity having a second diameter, the first diameter being greater than the second diameter.

67. (Previously presented) The changeable lock assembly of Claim 66 further comprising a master key having a contour edge configured to raise the plurality of master shims above the shear line, wherein any change ball positioned above the master shim can not be deposited into the retainer cavity in the second rotated position.

68. (New) A changeable lock assembly that can be reconfigured to operate with different keys of a set of user keys, without disassembling the lock, comprising:

a) a set of keys comprising at least a first user key having a first contour edge that operates the lock in a first lock configuration but does not operate the lock in a second lock configuration, and a second user key having a second contour edge that operates the lock in the second lock configuration but does not operate the lock in the first lock configuration, wherein the first contour edge and the second contour edge have at least a first contour position and a second contour position that are differently configured;

b) a housing having a generally cylindrical bore with an inner surface and a plurality of driver chambers intersecting the bore surface;

c) a plurality of drivers, each driver being positioned and movable within one driver chamber and being urged toward the bore surface;

d) a plug having a generally cylindrical periphery and rotatably mounted within the bore so as to form a shear line at the interface of the bore surface and the plug periphery, the plug further having:

- i) a longitudinal axis;
- ii) a keyway parallel to the longitudinal axis and configured to receive a key selected from the subset of keys;
- iii) a plurality of tumbler chambers intersecting the periphery and the keyway, and being generally orthogonal to the longitudinal axis, each tumbler chamber being

aligned with one of the plurality of driver chambers when the plug is at a first rotated position with respect to the housing so as to form a plurality of pin chambers;

iv) a plurality of retainer cavities intersecting the periphery, each retainer cavity being spaced apart from a corresponding tumbler chamber and aligned with a corresponding driver chamber when the plug is at a second rotated position with respect to the housing; and

v) a change tool slot that intersects a portion of the retainer cavities, and

e) a change tool movable within the change slot between a first position that does not intersect the plurality of retainer cavities, and a second position that intersects the plurality of retainer cavities;

f) a plurality of tumblers, each tumbler being positioned and movable within one of the plurality of tumbler chambers; and

g) a plurality of lock configuration change balls, each change ball being associated with one of the plurality of pin chambers, having a first position within said pin chamber between the driver and tumbler, and a second position within one of the plurality of retainer cavities, and being movable from the second position within said retainer cavity when the change tool is in the second position.

69. (New) The changeable lock assembly of Claim 68 wherein the first contour position of the first user key is a lower position and the second contour position of the first user key is a raised position, wherein the lock is in the first lock configuration, a first change ball corresponding to the first contour position is disposed in its pin chamber, and a second change ball corresponding to the second contour position is disposed in its retainer cavity, and wherein the first contour position of the second user key is a raised position and the second contour position of the second user key is a lower position, wherein when the second user key is inserted into the keyway, the driver that is disposed in the pin chamber corresponding to the second contour position spans across the shear line, whereby the plug can not rotate within the housing and the second user key can not operate the lock.

70. (New) The changeable lock assembly of Claim 68 wherein the change slot extends through the front face of the plug, and wherein the change tool is remote from the lock

during operation of the lock, has a linear upper edge that can raise each change ball out of its respective retainer cavity upon insertion into the change slot, and wherein the same change tool can be used to reset the lock and to reconfigure the lock for any key of the subset of keys.

71. (New) The changeable lock assembly of Claim 68, further comprising a programming key having a contour edge that, upon insertion of the programming key into the keyway, can raise any change ball, which is disposed in a tumbler chamber, above the shear line, and upon operation of the lock with the programming key, can move said change ball into its respective retainer cavity upon rotation of the plug to its second rotated position, whereupon the lock can be operated with the programming key, but not with the user keys.

72. (New) A changeable lock assembly comprising:

- a) a set of user keys comprising at least a first user key and a second user key, each user key having at least one contour position;
- b) a housing having a bore and a plurality of driver chambers intersecting the bore surface;
- c) a plug rotatably mounted in the bore, the plug having:
 - i) a longitudinal axis;
 - ii) a keyway parallel to the longitudinal axis, and configured to receive a key selected from the subset of user keys;
 - iii) a plurality of tumbler chambers intersecting the periphery and the keyway;
 - iv) at least one retainer cavity; and
 - v) a change tool slot that intersects a portion of the at least one retainer cavity;
- d) a change tool movable within the change tool slot between a first position that does not intersect the at least one retainer cavity, and a second position that intersects the at least one retainer cavity;
- e) a plurality of tumblers, each tumbler being positioned and movable within one tumbler chamber; and
- f) at least one change ball movable within the lock between a first position in one of the plurality of tumbler chambers and a second position within the at least one retainer cavity, the change ball being movable from the first position to the second position, to reconfigure the lock

for operation with the second user key, solely in response to insertion of the second user key into the keyway when the plug is in a first rotated position within the bore, and rotation of the plug by the operation of the second user key to a second rotated position within the bore;

wherein when the change ball is in the one of the plurality of tumbler chambers, the first user key operates the lock, wherein when the change ball is in the at least one retainer cavity, the first user key does not operate the lock and the second user key operates the lock.

73. (New) The changeable lock assembly of Claim 72, wherein the retainer cavity has an opening in the periphery of the plug, wherein the housing has a plurality of cylindrical driver chambers intersecting the surface of the bore, and further comprising a plurality of cylindrical drivers, each positioned and moveable within one driver chamber and being urged toward the bore surface, wherein the diameter of the driver is larger than the opening of the retainer cavity to prevent the driver from entering into the retainer cavity.

74. (New) The lock assembly of Claim 73 wherein the change ball is movable from the first position to the at least one retainer cavity only when the change tool does not intersect the at least one retainer cavity, and is movable from the at least one retainer cavity to the first position when the change tool intersects the at least one retainer cavity.

75. (New) The changeable lock assembly of Claim 73, comprising a plurality of between 2 and 10 change balls and a plurality of corresponding retainer cavities.